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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/719,852 | 11/21/2003 | Thomas S. Ramotowski | 83303 | 2927 |

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NAVAL UNDERSEA WARFARE CENTER
DIVISION NEWPORT
1176 HOWELL STREET, CODE 000C
BLDG 112T
NEWPORT, RI 02841

EXAMINER

HU, HENRY S

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| ART UNIT | PAPER NUMBER |
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1713

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/719,852

Applicant(s)

RAMOTOWSKI ET AL.

Examiner

Henry S. Hu

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Oath & Declaration of May 17, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11-21-2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. It is noted that USPTO has received an IDS filed on November 21, 2003. It is also noted that USPTO has received an **oath/declaration** for **POA** filed on May 17, 2004. **Claims 1-13 are now pending** with four independent claims (Claims 1, 7-8 and 13). The examiner **accepts Applicants' drawing in three sheets with Figures 1-6** filed on November 21, 2003 with this application. An action follows.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. *The limitation of parent **Claim 1** in present invention relates to an electrostrictive terpolymer comprising: (A) **vinylidene fluoride**; (B) **trifluoroethylene**; and (C) at least one monomer, wherein said at least one monomer is **an ethylene-based monomer and has at least one halogen atom side group**, wherein said at least one monomer favors **gauche-type** linkage along a backbone of a polymer chain of said terpolymer.*

*Parent **Claim 7** relates to terpolymer of Claim 1 with a specific combination of VDF, TrFE, and CFE (chlorofluoroethylene). Parent **Claims 8 and 13** each relates to a method of making film of terpolymer from Claims 1 and 7. See other limitations of dependent **Claims 2-6 and 9-12.***

4. Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Honn et al. (US 3,318,854).

Regarding the limitation of parent **Claim 1**, Honn et al. have disclose preparation of various fluorinated elastomeric copolymers comprising repeating units of **vinylidene fluoride (VDF), trifluoroethylene (TrFE) and 1-chloro-1-fluoro-ethylene (CFE)** as long as **at least one of the mono-olefinic compounds must contain at least one carbon atom linked only to hydrogen and carbon atoms** (column 2, line 9-41 and 42-66; column 1, line 69-72 and 63-64). Although only dipolymers are exemplified on column 2 at lines 50-66, the terpolymer of (VDF-TrFE-CFE) as disclosed in present application would be one among many copolymers therefrom. In a close examination, inherent property to carry the same or similar **gauche-type** linkage along backbone of polymer chain is thereby existed.

5. Regarding **Claims 2-6**, Honn discloses that any ratio on monomers of VDF, TrFE and CFE can be prepared with a condition as **at least 10 percent** of polymer is comprised of **-CH₂-** groups in order to obtain an elastomeric product (column 1, line 63-64; column 2, line 1-8).

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Parent **Claim 7** only relates to a terpolymer of Claim 1 with a specific combination of VDF, TrFE, and CFE (chlorofluoroethylene), it can be thereby rejected as above.

Parent **Claims 8 and 13** each relates to a method of making film of terpolymer from Claims 1 and 7. The disclosure on making film, coating and impregnate by Honn on column 5 at lines 5-10 and 65-66 would anticipate the limitations of Claims 8 and 13.

Remaining dependent **Claims 9-12** are thereby rejected with the above rejection for Claims 1-8 and 13.

6. Claims 1-3, 6, 8-9 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (US 4,543,293).

Regarding the limitation of parent **Claim 1**, **Nakamura** et al. have disclose preparation of a fluorinated piezoelectric copolymers comprising repeating units of vinylidene fluoride (VDF) (40-87 mol%), trifluoroethylene (TrFE) (10-40 mol%) and vinyl fluoride (3-20 mol%) (abstract, line 1-4; column 2, line 30-36). A small amount of one or more than one fluorinated monomer such as TFE, HFP, chlorotrifluoroethylene (CTFE) may be added (column2, line 39-43). It is noted that both vinyl fluoride and CTFE are related to “an ethylene-based monomer and has **at least one halogen atom** side group”. In a close examination on

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terpolymer's composition, inherent property to carry the same or similar **gauche-type** linkage along backbone of polymer chain is thereby existed.

7. Regarding Claims 2-3, Nakamura discloses that both vinyl fluoride and CTFE can be included.

Parent **Claim 8** relates to a method of making film of terpolymers from Claim 1. The disclosure on making a cast film by Nakamura on column 4 at lines 39-43 and column 6 at lines 3-7 would anticipate the limitation of Claim 8.

Remaining dependent **Claims 6, 9 and 12** are thereby rejected with the above rejection for Claims 1-3 and 8.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
9. Claims 4-5, 7, 10-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 4,543,293) in view of Honn et al. (US 3,318,854).

The above discussion of the disclosures of the prior art of Nakamura of this office action is incorporated here by reference. The above discussion of the disclosures of the prior art of Honn of this office action is also incorporated here by reference. Regarding **Claims 4-5, 7, 10-11 and 13, Nakamura is only using vinyl fluoride**. Therefore, he is silent about including the monomer of chlorofluoroethylene with additional chlorine atom as compared with vinyl fluoride to be with monomers of VDF and TrFE in the terpolymer. **Honn et al. teach that a terpolymer comprising repeating units of vinylidene fluoride (VDF), trifluoroethylene (TrFE) and 1-chloro-1-fluoro-ethylene (CFE) can be readily prepared with the condition as “at least one of the mono-olefinic compounds must contain at least one carbon atom linked only to hydrogen and carbon atoms”** (column 2, line 9-41 and 42-66; column 1, line 69-72 and 63-64). By doing so,

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when the polymer is combined with different crosslinking agents, a soft or hard vulcanizate as desired can be controllably obtained (column 3, line 25-43).

In light of the fact that copolymers produced by all the involved references are containing **the same or similar type of fluorinated comonomers** as well as both copolymers fit into the guideline as “at least one of the mono-olefinic compounds must contain at least one carbon atom linked only to hydrogen and carbon atoms”, one having ordinary skill in the art would therefore have found it obvious to **modify Nakamura’s copolymerization process by replacing vinyl fluoride with 1-chloro-1-fluoro-ethylene** as taught by Honn. By doing so, one would expect all embodiments in the same genus would succeed based on functional equivalence and interchangeability. Additionally, one advantage is to obtain a soft or hard vulcanized product with controllable properties as desired when cured with crosslinking agent due to the existence of chlorine atoms.

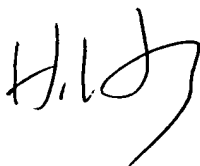
Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicants’ disclosure. The following references relate to an electrostrictive terpolymer comprising **vinylidene fluoride, trifluoroethylene and chlorofluoroethylene**: US Patent No. **4,863,648 to Scheinbeim** et al. discloses a process for making polarized material by forming a solution of a material capable of being polarized with a polarization solvent which can be removed by evaporation, wherein said material can be copolymers of vinylidene fluoiride with vinyl fluoride, TrFE, TFE, vinyl chloride and the like (column 4, line 55-61; abstract, line 1-4).

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Chlorofluoroethylene (CFE) is not disclosed or suggested as co-monomer at all. Additionally, gauche-type linkage along backbone of polymer chain is also not disclosed. Therefore, Scheinbeim fails to teach or fairly suggest the copolymers of present invention.

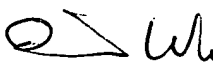
11. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Dr. Henry S. Hu whose telephone number is (571) 272-1103. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

June 21, 2005



DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700